

What is Claimed Is:

1. A method of manufacturing a stamper/imprinter for use in patterning of a recording medium, comprising sequential steps of:

(a) providing a substrate/workpiece comprising a topographically patterned surface including a plurality of projections and depressions  
5 corresponding to a pattern to be formed in a surface of a said recording medium;

(b) forming a thin release layer in conformal contact with said topographically patterned surface by means of a dry process;

(c) forming a thicker layer of a material in conformal contact with said thin release layer on said topographically patterned surface; and

10 (d) separating said thicker layer of material from said topographically patterned surface to form therefrom a stamper/imprinter including an imprinting surface having a negative image replica of said topographically patterned surface, separation of said thicker layer of material from said topographically patterned surface being facilitated by said thin release layer formed by said dry process.

2. The method as in claim 1, wherein:

step (a) comprises providing a substrate/workpiece wherein said topographical pattern corresponds to a magnetic pattern including a servo pattern for a magnetic or magneto-optical (MO) recording medium, a read-only memory  
5 (ROM) pattern, or a wobble groove pattern for a readable compact disk (CD-R) or a readable-writable compact disk (CD-RW).

3. The method as in claim 2, wherein:

step (a) comprises providing a substrate/workpiece wherein said topographical pattern corresponds to a magnetic pattern including a servo pattern for a magnetic or magneto-optical (MO) recording medium.

4. The method as in claim 3, wherein:

step (a) comprises providing a substrate/workpiece wherein at least said topographically patterned surface is comprised of at least one magnetic material having a high saturation magnetization  $B_{\text{sat}} \geq 0.5$  Tesla and a high permeability  $\mu$   
 5  $\geq \sim 5$ ;

step (b) comprises forming at least one passivating oxide of said at least one magnetic material as said thin release layer; and

step (c) comprises forming a layer of at least one magnetic material having a high saturation magnetization  $B_{\text{sat}} \geq 0.5$  Tesla and a high permeability  $\mu \geq \sim 5$  as  
 10 said thicker layer.

5. The method as in claim 4, wherein:

step (b) comprises forming said at least one passivating oxide as a thin release layer from about 50 to about 200 Å thick.

6. The method as in claim 4, wherein:

step (b) comprises forming said at least one passivating oxide by thermal oxidation of said at least one magnetic material in an  $O_2$ -containing atmosphere.

7. The method as in claim 4, wherein:

step (b) comprises forming said at least one passivating oxide by means of a plasma.

8. The method as in claim 7, wherein:

step (b) comprises treating said topographically patterned surface with an oxygen ( $O_2$ ) plasma under conditions selected for minimizing deformation and/or degradation of said pattern and for an interval sufficient for facilitating release of  
 5 said thicker layer of at least one magnetic material therefrom in step (d).

9. The method as in claim 7, wherein:

step (b) comprises forming said at least one passivating oxide by means of a DC, RF, or microwave plasma, or a combination thereof.

10. The method as in claim 9, wherein:

step (b) comprises exposing said topographically patterned surface to an oxygen (O<sub>2</sub>) plasma.

11. The method as in claim 10, wherein:

step (b) comprises treating said topographically patterned surface with an oxygen (O<sub>2</sub>) plasma under conditions selected for minimizing deformation and/or degradation of said pattern and for an interval sufficient for facilitating release of  
5 said thicker layer of at least one magnetic material therefrom.

12. The method as in claim 4, wherein:

step (a) comprises providing a substrate/workpiece comprising at least one magnetic material selected from the group consisting of: Ni, NiFe, CoNiFe, CoSiFe, CoFe, and CoFeV;

5 step (b) comprises forming said thin release layer as comprising at least one passivating oxide of at least one magnetic material selected from the group consisting of Ni, NiFe, CoNiFe, CoSiFe, CoFe, and CoFeV;

step (c) comprises forming a layer comprising at least one magnetic material selected from the group consisting of: Ni, NiFe, CoNiFe, CoSiFe, CoFe,  
10 and CoFeV as said thicker layer; and

step (d) comprises separating said thicker layer of at least one magnetic material from said topographically patterned surface to form therefrom a magnetic stamper/imprinter including an imprinting surface having a negative image replica of said topographically patterned surface, said magnetic stamper/imprinter  
15 being usable for contact patterning of magnetic recording media.

13. The method as in claim 12, wherein:

step (b) comprises treating said topographically patterned surface of said substrate/workpiece with an oxygen (O<sub>2</sub>) plasma under conditions selected for minimizing deformation and/or degradation of said pattern and for an interval  
 5 sufficient for facilitating release of said thicker layer of at least one magnetic material therefrom.

14. The method as in claim 12, further comprising:

repeating steps (a) - (d) at least once, utilizing the same substrate/workpiece provided in step (a), to form at least one additional stamper/imprinter therefrom

15. The method as in claim 12, further comprising:

utilizing the stamper/imprinter formed in step (d) as said substrate/workpiece for performing a sequence of steps (a) - (d) for manufacturing at least one additional stamper/imprinter therefrom.

16. The method as in claim 1, wherein:

step (c) comprises electroforming said thicker layer.

17. A method of manufacturing a plurality of stampers/imprinters for use in contact patterning of a magnetic recording medium, comprising sequential steps of:

(a) providing a first stamper/imprinter comprising a topographically  
 5 patterned surface including a plurality of projections and depressions corresponding to a magnetic pattern including a servo pattern to be formed in a surface of a said recording medium, said topographically patterned surface comprised of at least one magnetic material having a high saturation magnetization  $B_{\text{sat}} \geq 0.5$  Tesla and a high permeability  $\mu \geq \sim 5$ , selected from the  
 10 group consisting of: Ni, NiFe, CoNiFe, CoSiFe, CoFe, and CoFeV;

(b) forming a thin release layer, from about 50 to about 200 Å thick, in conformal contact with said topographically patterned surface by means of a dry

process, said thin release layer comprising at least one passivating oxide of said at least one magnetic material selected from the group consisting of Ni, NiFe, CoNiFe, CoSiFe, CoFe, and CoFeV; and

(c) forming a thicker layer of at least one magnetic material in conformal contact with said thin release layer, said thicker layer of at least one magnetic material having a high saturation magnetization  $B_{\text{sat}} \geq 0.5$  Tesla and a high permeability  $\mu \geq \sim 5$ , selected from the group consisting of: Ni, NiFe, CoNiFe, CoSiFe, CoFe, and CoFeV;

(d) separating said thicker layer of at least one magnetic material from said topographically patterned surface to form therefrom a second stamper/imprinter including an imprinting surface having a negative image replica of said topographically patterned surface, separation of said thicker layer of at least one magnetic material from said topographically patterned surface being facilitated by said thin release layer formed by said dry process, wherein:

said first stamper/imprinter is a "father" and said second stamper/imprinter is a "mother", or said first stamper/imprinter is a "mother" and said second stamper/imprinter is a "son".

18. The method as in claim 17, wherein:

step (b) comprises treating said topographically patterned surface with an oxygen ( $\text{O}_2$ ) plasma to form said thin release layer under conditions selected for minimizing deformation and/or degradation of said pattern and for an interval sufficient for facilitating release of said thicker layer of material therefrom in step (d).

19. The method as in claim 17, further comprising:

repeating steps (a) - (d) at least once, utilizing the "father" or "mother" provided as said first stamper/imprinter in step (a), to form at least one additional "mother" or "son" therefrom.

20. The method as in claim 17, further comprising:

utilizing a "mother" stamper/imprinter formed in step (d) as said first stamper/imprinter for performing a sequence of steps (a) - (d) for manufacturing at least one "son" stamper/imprinter therefrom.